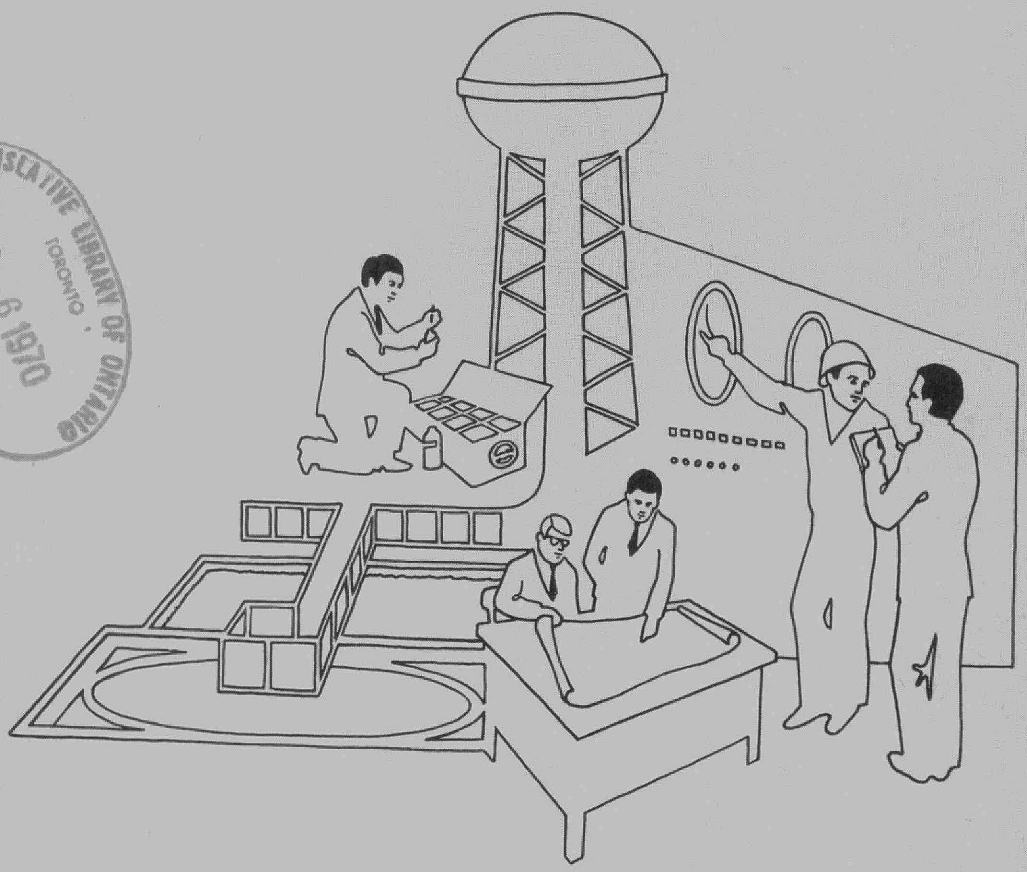
Water management in Ontario

Ontario Water Resources Commission

District Engineers Branch



WATER POLLUTION SURVEY

of the

HAMLET OF McGREGOR

COUNTY OF ESSEX

1970

REPORT OF A

WATER POLLUTION SURVEY

OF THE

HAMLET OF McGREGOR

TOWNSHIPS OF ANDERDON AND

COLCHESTER NORTH

COUNTY OF ESSEX

MAY 1970

DISTRICT ENGINEERS BRANCH

DIVISION OF SANITARY ENGINEERING

INTRODUCTION

A water pollution survey of the Hamlet of McGregor was undertaken in May 1970. This consisted of locating storm sewer outlets and sampling the effluent being discharged to the area watercourses. Supporting information for the survey was obtained from Mr L E Mailloux, Clerk-Treasurer of the Township of Anderdon, and Mr. H G. Shepley, Clerk-Treasurer of the Township of Colchester North.

The Ontario Water Resources Commission conducts routine water pollution surveys throughout the province. The objective of these surveys is to locate, record, and evaluate existing areas of pollution and also to determine future sources of pollution. Existing sewers and surface water drains are located and water samples are collected. These samples are then analyzed to determine the quality of the effluent that is being discharged to the receiving waters. Where pollution sources are found, recommendations and suggestions for abatement are made to the authorities concerned. To assist in the construction and financing of sewage treatment facilities, the OWRC has introduced a programme of assistance for municipalities. This programme is outlined in Appendix A, appended to this report.

GENERAL

The Hamlet of McGregor straddles the townline separating the Townships of Anderdon and Colchester North in the County of Essex. It has an approximate total population of 611 persons, with 304 in Anderdon Township and 307 in Colchester North Township.

The land around McGregor is drained by the Canard River System which flows west to the Detroit River. North of the Hamlet is Sucker Creek which flows into the Canard River approximately 2 miles west of the Hamlet. King Creek, south of the Hamlet, flows about 1 mile before discharging to the Canard. Both creeks are fed from ditches which drain the surrounding farmland.

Drainage within the Hamlet consists of catch basins and storm sewers along Walker Road and along the residential streets immediately east of Walker Road. The storm sewers discharge to the two creeks; 5 outfall to Sucker Creek and 1 outfalls to King Creek. The drains and outfalls are shown on the accompanying map.

The predominate soil type in this area is Brookston Clay. This is the poorly drained member of the Huron Catena which has developed from dolomitic limestone materials intermixed with a fair proportion of shale. Experience has shown that this type of soil is very unsuitable for the satisfactory operation of septic tank systems.

WATER SUPPLY

Prior to 1965, water was obtained from individual wells. Presently the Hamlet receives its water from the Amherstburg-Anderdon-Malden Area Water Supply System via an 8-inch diameter main along the Middle Sideroad. The domestic requirements are adequately satisfied, however at present, there is not enough capacity for fire protection.

SEWAGE DISPOSAL

The Hamlet of McGregor does not have a communal sewage collection and treatment system. However, storm drains and storm sewers on the main streets collect runoff and discharge it to the natural watercourses. Septic tank systems are used to service the individual homes and businesses in the Hamlet. Due to the clay soils and the corresponding poor drainage characteristics, these systems do not appear to operate adequately. As is customary in Essex County, overflow or curtain drains have been constructed in many of the field tile disposal beds. In most cases these overflow drains discharge directly to the adjacent storm sewers or to open ditches. Apparently in this case, the soil pores in the weeping beds have become clogged with sewage particles and subsequently, the absorption of septic tank effluent has caused the clay soils to swell. Consequently, sewage is

discharged through the overflow drains to surface water drains. The writer noted several places where overflow drains were discharging directly to open ditches. For example, at sampling point 2, discharge from a tile drain was noted. At this point there are 2 homes in the immediate vicinity and samples collected verified that the ditch was being grossly polluted by this discharge. It is also quite probable that older homes in the Hamlet, where there is insufficient land for field tile disposal beds, have direct connections from private disposal units to the storm drainage system.

Adjacent to Sucker Creek in the northeast corner of the Hamlet is the Lucier Mobile Homes Estate. The sewage from the trailers is directed to a holding tank which is periodically pumped and trucked away to Mr. Lucier's waste stabilization pond in Anderdon Township. Catch basins and storm drains have been constructed in the park to collect runoff from the lots and paved streets. The storm drains discharge to Walker Drain (see map).

The only "wet" industry in the Hamlet is the Galipeau Canning Factory. This plant processes tomatoes during the canning season. The operation is usually 6 to 7 weeks covering the months of September and October. The liquid wastes are pumped to an open ditch behind the canning factory and periodically sprayed on

adjacent farmland. The ditch is cut off from Sucker Creek and reportedly wastes are not allowed to enter the creek. The solid wastes are spread on nearby fields.

REFUSE DISPOSAL

Garbage from the Hamlet is collected and disposed of in the County landfill site in the Township of Colchester North.

WATER QUALITY ANALYSES

In order to determine the degree of pollution being discharged from McGregor, water samples were collected from the storm sewer outfalls. To assess the quality of the receiving streams additional samples were taken from Sucker Creek and King Creek.

The results of the sanitary chemical analyses and the bacteriological examinations of the water samples are presented in Table I. The locations of the sampling points are shown on the accompanying map.

DISCUSSION

An explanation of the major parameters used to evaluate the pollutional strength of sanitary wastes is presented in Appendix B.

A study of the analysis results shown in Table I confirms the visual evidence of pollution in the Hamlet of McGregor. Extremely high levels of pollution were noted in all of the storm

drains discharging into Sucker and King Creek. Sample No. 2 indicates the high level of pollution that can result from inadequately treated sewage coming from a relatively lightly populated area. The effect of the wastes being discharged into Sucker Creek can be noted when a comparison is made between the sample taken upstream of the discharge points and the sample taken downstream.

The high BOD, ABS and suspended solids concentrations, and the high coliform counts indicate that the primary source of pollution is domestic sewage. It is most likely that sewage is escaping from septic tank systems through direct connections to the storm sewers and through overflow drains. Visual observation indicated that sewage was discharging from overflow drains to open ditches in the Hamlet as in the case of Sample No. 2. It is expected that the older homes in the Hamlet do not have proper weeping bed installations and that direct discharge is made to the storm drains.

CONCLUSIONS & RECOMMENDATIONS

It should be noted that the discharge of polluting material into a drainage system or watercourse is in violation of regulations under the Ontario Water Resources Commission Act, Section 27, Subsection 1.

Remedial measures are required to prevent the discharge of polluting material to the watercourses in the vicinity of the Hamlet of McGregor. There are two main avenues to attack the existing problem. One would be to make corrections on an individual basis. Under the supervision of the County Health Officials, alterations to the existing septic tank systems could possibly be made to prevent the discharge of wastes. However, as pointed out earlier in this report, the soil conditions are incompatible with the efficient use of non-effluent producing systems. Since individual efforts would not likely prove successful, then attention must be turned towards the idea of a communal sewage collection and treatment system. This would be the best course of action to take since it would definitely alleviate the present conditions of pollution. In this regard, it should be realized that both of the available receiving streams in the area, namely Sucker Creek and King Creek, have low flows and correspondingly low assimilation capacities. This therefore, will impose a limiting factor on the future urban growth of the Hamlet.

In conclusion, the results of visual observations and samples collected during the survey reveal that the watercourses in the vicinity of the Hamlet of McGregor were being polluted by domestic wastes originating from homes in the Hamlet.

RECOMMENDATION

It is recommended that a communal sewerage programme be initiated to rectify the existing pollution conditions and to prevent further impairment of the local watercourses.

Prepared by : G W Todd .....

G. W. Todd, Engineer's Assistant,
Division of Sanitary Engineering

TABLE I
HAMLET OF McGREGOR
WATER POLLUTION SURVEY
MAY, 1970

Sample Number	Location of Sampling Point	BOD	Solids			ABS	Coliforms per 100 ML
			Total	Suspended	Dissolved		
1	Outfall - into King Creek	150	868	34	834	21.4	94,000,000
2	Open ditch - east side of Walker Road, south of village	130	918	59	859	19.8	13,000,000
3	Catch Basin - Southeast corner of Arquette near tracks	120	626	33	593	18.6	940,000
4	Catch Basin - Southwest corner of Arquette near tracks	130	1,120	70	1,050	14.4	910,000
5	Open ditch - Southeast corner of bridge at Sucker Creek and Walker Road	100	716	26	690	13.0	68,000,000
6	Outfall - Southwest corner of bridge at Sucker Creek and Walker Road	200	654	76	578	18.6	75,000,000
7	Outfall - Northwest corner of bridge at Sucker Creek and Walker Road	240	792	103	689	19.0	35,000,000
8	Outfall - Northeast corner of bridge at Sucker Creek and Walker Road	10	556	12	544	<0.5	700

TABLE I (continued)

Sample Number	Location of Sampling Point	BOD	Solids			ABS	Coliforms per 100 ML
			Total	Suspended	Dissolved		
9	Sucker Creek - 600 feet upstream of bridge	4.2	424	14	410	<0.5	11,000
10	Outfall - into Sucker Creek 400 feet upstream of bridge	48	588	45	543	10.0	35,000,000
11	Sucker Creek - 400 feet downstream of bridge	10	440	20	420	<0.5	210,000

APPENDIX A

IMPLEMENTATION OF WATER AND SEWAGE WORKS PROGRAMMES

Currently, there are three general methods which may be utilized for implementing sewage and water works programmes. These are: 1) to enter into an agreement with the OWRC for the construction of the treatment and collector works with an obligation to pay the debit retirement and operating charges over the term of the agreement with the facility reverting to the municipality at the end of the term of the agreement, 2) by requesting the provision of service from a Provincially-owned project, and 3) by proceeding with the construction independently and meeting capital costs by the sale of debentures.

OWRC/MUNICIPAL PROJECTS

For the construction of water and sewage works under agreement with this Commission, the works are provided and developed under Sections 39 to 46 of the Ontario Water Resources Commission Act.

For this type of arrangement, the Commission utilizes a sinking fund and consequently the annual payments are based on a specific debt retirement period and the payments are unchanged for the period of the agreement. This type of project may be financed over a period of time up to a maximum of thirty years. The annual charges for projects constructed under this agreement are determined as follows:

1. Capital Repayment

As noted, OWRC financing is by the sinking fund method and an annual payment of approximately 2 per cent of the capital cost is required to retire a debt over a thirty-year period.

2. Interest

On new Commission projects, interest is calculated at the current rate.

3. Reserve Fund

To provide money for repairs and replacements, Section 40 of The Ontario Water Resources Commission Act provides for the establishment of a reserve fund by the Commission. It is important to note that this fund is established in the name of the municipality and the balance consequently earns interest. It has now been established by Commission minutes that the reserve fund billing for each project shall continue only until the fund reaches an amount of ten times the initial annual billing and the reserve fund billing shall be re-imposed only when the fund has been depleted to 80 per cent or less of the maximum amount.

4. Operating Costs

Under OWRC agreement, the municipality is responsible only for the operating costs directly attributed to the

project in the municipality. Therefore, no charges are made by the Commission for the services of head office personnel who are available as required to advise on the satisfactory operation and maintenance of the project.

PROVINCIALLY-OWNED WORKS

In June 1967, the Honourable J. R. Simonett, Minister of Energy and Resources Management, made an announcement which expanded the authorization of this Commission for the provision of water supply and sewage treatment facilities. This new programme allows the Commission to construct entire water and sewage works facilities for small municipalities. The capital costs of these can be amortized over a 40 year period.

A slight variation of this programme could be implemented in that the municipality may request that this Commission provide only the major water and sewage works facilities as Provincially-owned works, and develop the water distribution and sewage collector systems under the standard type of Commission project. It would appear that, where applicable, it would be more advantageous for the municipality to proceed on the basis of requesting this Commission to develop entire systems as Provincially-owned works.

The associated cost of supplying these works, including amortization of capital costs, together with operating and maintenance charges, will be recovered by the sale of service to the

affected municipalities by rates determined on a usage basis. These facilities will be wholly-owned by the Province of Ontario and the arrangements for service will be formalized by contracts between the Commission and the municipality concerned. The installations will be operated entirely at cost with appropriate provision for adjustment in rate.

APPENDIX B

INTERPRETATION OF ANALYSES RESULTS

BACTERIOLOGICAL EXAMINATION

A bacteriological examination of water samples is made to determine the number of coliform organisms in a 100 millilitre sample of water. The presence of coliforms is an indication of pollution from faecal and non-faecal sources. The objective for bacteriological quality of surface water in Ontario is a maximum limit of 2,400 coliform organisms per 100 millilitres.

SANITARY CHEMICAL ANALYSES

(a) Biochemical Oxygen Demand (BOD)

BOD is defined as the amount of dissolved oxygen required by bacteria for the stabilization of decomposable organic matter under aerobic conditions. The BOD test is widely used to determine the pollutional strength of sewage and industrial wastes in terms of the oxygen that they will require if discharged into natural watercourses in which aerobic conditions exist. In other words, the discharge of wastes to natural waters causes a reduction of the dissolved oxygen concentration to levels which cannot support normal aquatic life. The recommended maximum BOD concentration for watercourses is 4 ppm.

(b) Solids

The total solids consists of a combination of suspended solids and dissolved solids. The suspended solids determination is extremely valuable in the analysis of polluted waters and sewage.

Along with the BOD it is one of the major parameters used to evaluate the strength of sewage. It indicates the amount of organic and inorganic material that is in suspension in the wastewater. This adversely affects the receiving waters by increasing the deposition in the stream, and by upsetting the natural habitat of fish. In addition, if the receiving waters are to be used as a water supply, a greater degree of purification will be required. Therefore, the OWRC recommends a maximum suspended solids concentration of 15 ppm in the wastes being discharged to a watercourse.

(c) Anionic Detergents

The presence of detergents in natural waters usually indicates contamination by domestic wastes. A common synthetic detergent is the anionic type and it is referred to as ABS (Alkyl Benzene Sulphonate). The objective for natural waters is 0.5 milligrams per litre or less.

Mc GREGOR

N

TO CANARD RIVER

RENAUD - DROULLARD DRAIN

SUCKER

WALKER RD.

WEST TOWNLINE DRAIN

WALKER DRAIN

CHESAPEAKE & OHIO RAILWAY

CREEK

LUCIER MOBILE HOME ESTATES

PARKSIDE RD.

BLUE ST.

GALIPEAU CANNING FACTORY

WELLINGTON ST.

GALIPEAU D & W

GAYLOR ST.

PARNELL ST.

STEWART

SCHOOL

AVE.

CHARLES ST.

GRONDIN

JUBINVILLE DRAIN

GAGNON LACLAIR AWARD DRAIN

MAJOR KNAPP D & W

RAILWAY

FERTILIZER PLANT

CENTRAL

MILL ST.

MICHIGAN

U. M. KNAPP D & W

CENTRE ST.

ARQUETTE AVE.

GRONDIN DRAIN

JOHN KNAPP D & W

6 & 7 SIDEROAD (MIDDLE SIDEROAD)

11th CON.

BROUSSEAU DRAIN

DUFOUR DRAIN

PARENT TREMBLEY D & W

WALKER RD.

CREEK

KING

TO CANARD RIVER

KNISTER AWARD DRAIN

1 2 3 4 5 6 7 8 9 10 11

LEGEND

——— — STORM SEWERS

– – – – – — OPEN DRAIN

(9) — SAMPLING POINT

ONTARIO WATER RESOURCES COMMISSION

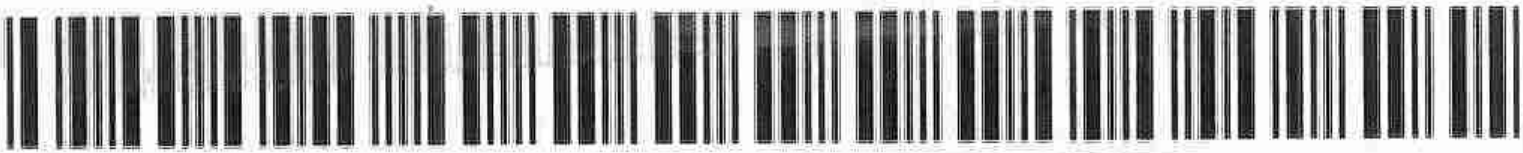
POLICE VILLAGE OF Mc GREGOR

TOWNSHIPS OF ANDERDON & COLCHESTER NORTH

WATER POLLUTION SURVEY

1970

SCALE : 400 0 400 FT. Approx.	
DRAWN BY : L. L. BROOME	DATE : JUNE, 1970
CHECKED BY : G.T.	DRAWING Nº : 70-86-DE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